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***Edward Mleczko***

For the fifth time but certainly not the last *Auksology and Promotion of Health* edited by Andrzej Jopkiewicz

*Jerzy Januszewski, Edward Mleczko, Renata Nieroda*

### **Triple- and double-compound morphological age in evaluation of selected components of physical fitness in girls under the terms of health-related fitness (H-RF)**

**Aim of the work.** To determine the formula for calculating the age of morphological development; to make an evaluation of somatic determinants of development level under the terms of physical health (H-RF).

**Material.** The material of the research forms the population of 5229 girls from Małopolska aged 8–17 calendar years, divided into year groups. From these groups the classes of 8, 9, 12, 13, 16, 17 years of calendar age were chosen as the subjects. After that from each above-mentioned year group, 150 participants were drawn with regard to basic components of physical fitness under the terms of H-RF and morphological age. Then from each year group a team of 50 subjects was selected and ranked in order of the height (upper, middle, lower) and weight (heavy, medium and lighter) of participants.

**Methods.** In randomly selected groups and in extreme teams, formed in accordance with body height and weight development level, statistical characteristics of basic components of physical fitness (under the terms of H-RF) were calculated due to morphological age, determined on the basis of calendar age, height and weight. Omitting participants from the group of average body weight and height, in remaining teams (each of 50 subjects) the measures were taken in regard to establish standardized mean differences in values of examined physical fitness components and morphological age. Strength of relationship between them was determined using simple and partial correlation coefficients. The significance of intergroup differences and correlation coefficients were examined with the Student's  $t^{\circ}$ -test.

**Results.** In the majority of relations very poor somatic conditioning of physical activity (under the terms of H-RF) was observed. In groups of high and low body weight and height the structure of calendar age formula for determining the age of morphological development played insignificant role. The greatest influence on numerical value exerted the age of body weight.

**Conclusions.** In the progressive development of children and adolescents from Małopolska both: somatic and motor developments have run their own tracks. There is no reason for taking into account chronological age in the formula for calculating morphological age, whereas anthropological methods should be taken into account when assessing the progress of children and adolescents' development of height and body mass.

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*Adam Haleczko, Ryszard Jezierski, Leszek Korzewa, Ewa Misiołek, Urszula Włodarczyk*

### **Mental efficiency and motor ability in 11 years aged children**

**Introduction.** A proper growth of somatic and motor features creates the basis of correct psychological and mental development of a child. This opinion is confirmed by significant relations between mental handicap and retardation of the physical growth as well as development of the physical ability, especially the nerve-motor coordination. Many authors underline, that faster developing children are characterized by better physical growth, higher mental efficiency and gain better school marks in comparison to their slower developing and even normally developed peers.

Pieter, in his pre-war publication, assuming that cortex which does condition higher level of the one function or aptitude cannot determine lower level of the other function, came to a conclusion that the intellect and the motor aptitudes are highly correlated. Nevertheless the English researchers have quite different opinion. They state that in normally developed children connection between intelligence and physical ability is negligible. However in mentally retarded children such correlation is observed. The influence of mental efficiency on motor ability may be studied indirectly, i.e. without direct estimation of the mental efficiency, by comparison the results of the motor ability tasks in mentally handicapped and mentally normal children. To this end the most useful could be tests of coordination commonly called as agility tests. The difference between results of tests in these two groups of children gives information on both the mental efficiency and the physical ability.

**Aim of the work.** Searching for motor trials connected with correlation between mental efficiency and motor abilities for the sake of effectiveness of children selection.

**Material and methods.** The physical development was estimated on the basis of measurements of basic somatic traits and birth data in the group of 63 girls and 56 boys in the fourth form of grammar school. The mental efficiency was established by means of the Raven test and supplemented by final school marks. Results of four trials which are used in selection of children for sport training describe motor abilities of the children under consideration. Basic statistical methods were used in working out of data.

**Results.** In comparison to the population of Wrocław children no difference was found with regard to the certificate age and the morphological age as well as in basic morphological traits. Results of girls and boy did not differ in fact. Due to the better results of the hang down gym-ladder cross and the pass over and under crossbar the boys were better in total estimation of motor ability. Girls obtained the better results in jumps over a batten. The results of Raven test were somewhat better in boys than in girls, but average school marks were the same. In agreement with common expectations the higher marks in Polish language gained the girls, while boys were better in mathematics. Calculation of correlation between Raven test and motor trials showed in both groups the significant connection with jumps over a batten. Then the correlation between school marks and results of this trial and Raven test was calculated. In both groups the most strong connections were found between the results of Raven test and the marks in mathematics. However the correlation between marks of mathematics and over batten jumps were significant only in boys.

**Conclusions.** Only some coordination tests have common features with the mental efficiency. It justifies the necessity of doing further research in this field. There are two ways to do it. One – on the basis of differences between results of selected motor trials in mentally retarded and mentally normal groups. Second – searching or inventing some special motor trials which will connect elements of mental efficiency with motor abilities.

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*Gabriela Jednoraj, Zofia Ignasiak*

### **Evaluation of morphofunctional development level in adolescents from ecologically threatened regions – early report**

**Aim of the work.** With the progress of civilization and increasing industrialization, a number of threats to health and correct functioning of the human organism is increasing. Amongst many factors the more and more great attention is being paid to the influence of the environmental pollution on morphofunctional development of man. The aim of work was searching the level of basic somatic and functional parameters at boys and girls inhabiting the contaminated ecologically region.

**Material and methods.** The subjects selected for the study were young people aged 14 years from the city Legnica, located in the Copper Mine District. The research was provided in April and May 2009 and there were measured basic somatic parameters such as: body height and weight, sum of 3 skin-folds-fatty tissue, amplitude of the chest, and functional abilities: static strength of legs, explosive strength of legs and hands, the suppleness, the speed of movements of hands and the locomotive speed. A questionnaire form examining socioeconomic factors of families of examined pupils was also conducted.

**Results and conclusions.** Received results were subjected to a statistical analysis; results achieved by boys and girls were compared, and next, results from own examinations were compared with other made on inhabitants of different areas of the country and foreign countries. In terms of somatic parameters the examined young people achieved better results from the majority of peers from other areas of the country and it can result in relatively high level of economy development and urban character of Legnica. Authors also suppose that the weaker results in efficiency tests could be caused by the influence of extrinsic factors, especially an environmental pollution which influences more on functional than somatic parameters.

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*Daniel Puciato*

### **The level of somatic and motor development among children from Jedlina-Zdrój in the light of the subjective quality of life of their families**

**Aim of the work.** To determine relations between the somatic structure and motor efficiency among children and young people, and the subjective quality of life of the families they come from.

**Material and methods.** The research included 524 students (277 boys and 247 girls) aged 8–16 that went to the primary and junior secondary schools in Jedlina-Zdrój. Height, body mass and three skin-fat folds were measured. Furthermore, the body mass index and lean body mass were calculated. Additionally, fitness tests were carried out, including: hitting disks with a hand; swinging run for 10 × 5 m; long jump from a spot; sit-ups from lying on the back; throwing a 1kg medicine ball; and bend to reach forward while sitting. Then the maximum anaerobic work was calculated. Development tests of children were supplemented by a poll among their parents related to the quality of life of their families.

**Results.** The subjective quality of life index significantly differentiates the height among the men. The tallest boys are found among parents who declare the average level of satisfaction of life. Their height significantly differs from those of boys whose families declare the low and high satisfaction of their life. In respect of functional parameters, only the motion pace demonstrate a growing gradient together with an increasing satisfaction of life. Differences between groups of families showing low and average, and low and high subjective level of the quality of life are characteristic. Likewise among women. The quality of life index differentiates the height in a monotonic manner. The best results in the test that verified the running speed were obtained among girls from families of the average satisfaction of life level.

**Conclusions.** The subjective quality of life index among families significantly differentiates the height and running speed of tested children.

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*Andrzej Kochanowicz, Kazimierz Kochanowicz*

### **Strength and endurance preparation and the effectiveness of sports training in gymnasts aged 11–13**

**Aim of the work.** Directing a sports training in artistic gymnastics is based on justified values of control allowing the diagnosis and prognosis of the development of special fitness and athletes' sports results. The aim of the study was to determine the interdependence between strength-endurance skills and sports preparation in athletes of selected gymnastic events at the stage of directed training.

**Material and methods.** 15 boys aged 11–13 practising artistic gymnastics at the stage of directed training in the MKS AZS AWFIS Gdańsk and the Sports Mastery School in Gdansk were subject to the study. The study was carried out in laboratory, training and competitive conditions in 2004–2007.

**Results.** An analysis of results allowed indicating the most informative strength-endurance indices having a significant correlation with the technical preparation in the following events: pommel horse, rings, parallel bars and H-bar. Quantitative criteria of the following indices have been worked out: strength-endurance, special fitness and technical preparation in half-yearly macrocycles of the training process. Individual profiles of special fitness with an indication at their changeable character in the three-year study period have been presented.

**Conclusions.** 1. The most significant in the control at the directed training stage in gymnasts are indices of relative isometric strength of upper extremities flexors and the isokinetic strength endurance of upper extremities extensors. 2. The study results allowed to work out the criteria of assessment of strength-endurance skills and the level of sports preparation which enable referring various control indices to the syllabus requirements posed in the specific half-yearly macrocycle in a unified point scale. 3. Creating individual profiles of special fitness enables optimisation of the training process in particular training macrocycles.

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*Stanisław Sterkowicz, Stanisław Żak*

### **Sexual dimorphism in elite volleyball players**

**Aim of the study.** (1) Determination of the level of physical development in elite male and female volleyball players. (2) Assessment of motor effects achieved during volleyball-specific tests. (3) Investigations of sexual dimorphism for the characteristics of body build and motor abilities among persons who play volleyball.

**Material and method.** In the group of 144 female and 144 male players, the participants of the Olympic volleyball tournament (Beijing 2008), age, body height, mass, body mass index and special physical fitness (which covered maximal arm reach in attack and defence) were determined and analysed with regard to sexual dimorphism. After that, sexual dimorphism index (SDI) was calculated. Interpretation of the results took into consideration the factor of tactical formation at five levels: opposite, libero, outside hitter, setter and middle blocker.

**Results.** The highest level of sexual dimorphism (independent of tactical formation) was confirmed for BMI variable. Considerably higher level of sexual differences in arm reach (attack and defence) than in body size in favour of men was also noticed. All observed differences were determined in relation to net's height over which male and female volleyball players play.

**Conclusions.** All these who play volleyball are distinguished by a huge body height. Compared with Ross standard, body mass for players in each tactical position is lower. Opposites diverge from this standard the most, whereas middle blockers are best fitted. Somatic and motor demands of the game at different tactical positions should be taken into consideration during selection and volleyball training. Considerably higher dimorphism in the area of energy abilities rather than somatic abilities should postulate the increase in net's height for the men. Solving this problem through other modifications of volleyball rules is also taken into account.

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*Robert Rokowski, Stanisław Żak*

### **Importance of motor skills on energy ground in sport climbing in competition of on-sight – the analysis of cases**

**Aim of the research.** To establish the importance of strength and endurance in the group of professional climbers.

**Material and methods.** The study included 30 high-performance sport climbers. From this group seven best climbers were selected. Their results were used to determine the strength and resistance profile of a climber. The strength of the fingers was tested with a dynamometer and a specific test was used – the overhang on 2,5 cm strip with the maximum load. Arm strength was measured by the elevating on bar with the maximum weight. Muscle resistance to fatigue in the isometric contraction was also examined – the sample consisted of overhanging as long as it was possible on the 2.5 cm and 4 cm strips and on the bar with the upright arms. In addition, the resistance of arm was tested with “pull ups” test and so-called Edlinger's alphabet.

**Results.** As it was found out, distinctive features of high-performance climbers were: the size of special force of fingers, muscle resistance to fatigue in the isometric contraction of upper limbs as well as the resistance of arms. The interesting thing observed in the study was that the model climbers were characterized by a lower level of force of dynamometric squeeze. Considerable variation of results was observed within motor effect measuring the force of arms.

**Conclusions.** On the highest level of training within special efficiency the attention should be paid on the shaping of special force of the fingers and the special endurance of fingers and arm strength endurance. Proportional development of these factors should be considered as reasonable and necessary. Classical dynamometric tests and tests for the special climbing purposes are characterized by certain motor separateness.

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*Andrzej Lachowicz*

### **Effectiveness of 11–13-year-old footballers training based on small and auxiliary games**

**Introduction.** Modern football challenges to be faced by players encourage search for training forms and methods which will facilitate effective preparation for playing under the opponent's pressure and improve performance in 1 v. 1 situations. To address the issues it may be useful for football training to apply more exercises based on small and auxiliary games.

**Aim of the study.** The aim of the research is to determine the effectiveness of 11–13-year-old footballers training that contains small and auxiliary games to improve their performance during the game proper.

**Material and methods.** The research covered footballers from 11–13 years of age. A teaching experiment was conducted, where the main objective was to apply training based on small and auxiliary games to an experimental group, with progress being observed against a comparative group. All players were subject to regular examinations, with a set of test tasks being repeated every six months, including: 1) a series of three practice matches between the experimental group and the comparative one; performance data were recorded onto A. Szwarc observation sheets; 2) INKF general physical fitness test.

**Results.** The applied training resulted in improvement of the experimental players' performance in respect of 1 v. 1 situations and tasks under difficult conditions. At the same time no fitness loss was observed as regards other actions. Throughout the experiment, the players of both groups showed a comparable level of motor capacities examined.

**Conclusions.** Football training based on small and auxiliary games may constitute an effective way to enhance training efficiency in terms of improvement of players' performance in 1 v. 1 situations and under the opponent's pressure during the game proper.

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*Józef Bergier, Andrzej Soroka*

### **The multidirectional shot analysis of victorious and lost teams during Women`s European Football Championships – Finland 2009**

**Aim of the work.** The aim of the work was to define the differentiation of shot effectiveness of victorious and lost teams. The purpose of the authors was to characterize the structures of offensive actions taking into account their duration, a number of passes and a number of football players who participated in these actions.

**Material and methods.** There were analyzed 25 matches, within which 75 actions ended with scoring a goal during finals of Women's European Championships in 2009. The method of observation was applied as the most appropriate in this kind of studies, and the research tool was restricted to author's sheet of observation. There were also created tabular and graphical characteristics that presented the efficiency of shots to the goal of the players from European elite, who were divided into victorious and lost teams. The results of research were analyzed statistically using Statistica program. The arithmetical means and standard deviation were counted, and the differences between average values of shot effectiveness for independent groups were specified with the Student's t-test.

**Results and conclusions.** The female football players of victorious teams conducted a greater number of shots to the goal, effective shots and reached higher value of indicator of shot effectiveness. Players of victorious teams more often than those of lost ones began the offensive actions in defence zone. Teams of winners more often conducted offensive actions with scoring a goal which mostly appeared after individual actions.

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## REVIEW PAPERS

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*Waldemar Makuła*

### **Physical culture of ageing generations in light of the chosen research provided by authors in Poland and abroad**

This work concerns the problems of human ageing, which are connected with seniors' participation in physical culture forms. Healthy and successful ageing based on providing by seniors a regular movement is often undertaken by the researchers in this field in Poland and abroad. That is why in this work there are reported the examples of research from Poland, Belgium, Great Britain, Holland, the United States of America, Canada and Japan focused on the characteristics such as a level of seniors' physical fitness and other parameters of physical effort, the reasons inclining them to take part in movement, the forms of movement preferred by seniors, which are typical for ageing people engagement in physical activity. However one can find some differences among these investigations being a result both of the respondents' socio-cultural background and the methods used while investigating, the main trends found in the research reported seem to be common. So that, the way of solving successfully the common problems in the field gives a real chance to engage more seniors in health-related movement.

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## DISCUSSIONS

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*Wacław Petryński*

### **Mathematics and consciousness – mind models by Penrose and information processing in a human**

The author presents the mind models created by outstanding mathematician Roger Penrose. From critical analysis of the models, it results that mathematics – and any other crystallized branch of contemporary science – is able to create only a specific representation of phenomena and processes under research, because of their own limitations resulting from its specificity and methodologies recognized in the given branch as scientific. Because of such constraints, any representation created by a single, mature branch of science – with established methodology – cannot make a complete image of reality, and the analyses basing on different premises and methodologies are necessary. The author suggests a pattern of information processing in a human. Taking it as a basis, he determines the scope of meaning of terms “attention”, “mind”, “prudence”, “consciousness” etc. Then this pattern is compared to Penrose's models, basing on assumption that the equivalent of calculations is intelligence. The author distinguishes the connections, i.e. information transfer inside an element of information processing system, and the associations, related to information transfer between the elements of the system. Then, taking as a basis the way of thinking by Penrose, he creates the four models basing on information processing chain in a human. They are associated with the system approach by Morawski. Finally, the author presents the role of theory creation in physical education sciences and their possible connections with other branches of science, mainly psychology and mathematics.

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## REVIEWS

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*Edward Mleczko*

### **For the fifth time but certainly not the last *Auksology and Promotion of Health* edited by Andrzej Jopkiewicz**

Lack of summary.

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